Oxygen Cleaning Products Preliminary Testing

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Background

Historically, solvents such as 1,1,2-trichloro-1,2,2-trifluoroethane and 1,1,1-trichloroethane have been the chemicals of choice for NASA, the Department of Defense and the aerospace industry in cleaning aviation oxygen systems and components. The U.S. Environmental Protection Agency classified and regulated these chemicals as Class I (most harmful) ozone depleting substances. In the mid 1990's, in response to the U.S. Clean Air Act and Montreal Protocol, aerospace organizations began replacing these Class I ozone depleting chemicals with less harmful hydrochlorofluorocarbons (HCFC), which are still ozone depleting substances (Class II). Two common HCFCs are 1,1-dichloro-1-fluoroethane (HCFC-141b) and 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC 225g). The Class II solvents provide only a temporary solution, however, because the Clean Air Act and Montreal Protocol have set finite caps and phase-out dates for their manufacture. Other qualified solvents, such as hydrofluoroethers, are not ozone depleting but are limited in the applications in which they can be used.

Objective

Engage academia's green engineering and environmentally benign design capabilities to overcome existing barriers of using Class II ozone depleting substances as qualified cleaning agents for oxygen systems and related components. A thorough understanding of oxygen cleaning standards and cleanliness verification science must be examined and evaluated for potential exploitation by new chemical science to overcome the inclusion of environmentally hazardous components to achieve the desired results.

Period of Performance

- October 2008 – September 2009

Stakeholders

NASA White Sands Test Facility and Yale University

Benefits

- Eliminate the obsolescence risk due to pending phase out of existing ozone depleting substances for cleaning oxygen systems and components
- Provide environmentally benign cleaning technology for space and aviation breathing systems

Document Status

- Not applicable at this time.

Recent Progress

- Drafted Test Protocol; being reviewed by project team.

Milestones

- Delivery Order awarded – November 2008

Near-Term Goals

- Complete Test Protocol
- Resume testing initiated during Year 1 of project

Updated 1/31/09